Abstract

An apparatus for exciting and detecting NQR in a substance containing quadrupole nuclei responsive to the NQR phenomenon. The apparatus includes a coil 15 for irradiating an item that may contain a substance with RF waves to excite NQR in quadrupole nuclei within the substance and for receiving an NQR signal emitted in response thereto. A transmitter unit 10 is provided for producing and transmitting an RF pulse to the probe to create said RF waves. A receiver unit 11 is provided to receive and treat a received signal from said probe for subsequent processing and detection of a said NQR signal therein. A sensing means is included in the apparatus for sensing an extraneous parameter that may influence the detection of the NQR signal from the item to be scanned. A computer 12 is provided for processing the treated received signal to identify a said NQR signal therein, and control the transmitting means and the receiving means in response to said processing means and said sensing means to optimise the excitation and detection of the NQR signal. The sensing means may comprise one or more temperature probes 13, RF antennas 17, metal detectors 18, metal imagers 19, temperature tags 20 and optical or infrared scanners 22 and 23, or any one or combination of these.